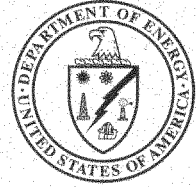


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U.S. Department of Energy
Idaho Operations Office

***Operable Units 6-05 and 10-04, Experimental
Breeder Reactor-I/Boiling Water Reactor
Experiment Area and Miscellaneous Sites,
Remedial Design/Remedial Action Scope
of Work***



Idaho National Engineering and Environmental Laboratory

**Operable Units 6-05 and 10-04, Experimental Breeder
Reactor-I/Boiling Water Reactor Experiment Area and
Miscellaneous Sites, Remedial Design/Remedial
Action Scope of Work**

February 2003

**Prepared for the
U.S. Department of Energy
Idaho Operations Office**

ABSTRACT

The Waste Area Group 6 Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Waste Area Group 10 Miscellaneous Sites are two of 10 Idaho National Engineering and Environmental Laboratory waste area groups identified in the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* by the U.S. Department of Energy; the U.S. Environmental Protection Agency, Region 10; and the Idaho Department of Environmental Quality. The *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* required development of the Operable Unit 10-04 Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10. The remedial design/remedial action identified in this Scope of Work—as part of the Comprehensive Environmental Response, Compensation, and Liability Act process—will proceed in accordance with the Operable Unit 10-04 Final Record of Decision.

This Remedial Design/Remedial Action Scope of Work initiates the remediation process for each remedy in the Record of Decision and establishes the framework and overall strategy for managing the remedial design process through commencement of remedial action work elements. The remedial design consists of a series of requirements, documents, specifications, and drawings that detail the steps to be taken during the remedial action to meet the remedial action objectives established in the Record of Decision. This Scope of Work provides the assumptions and strategies for meeting these objectives.

As the Idaho National Engineering and Environmental Laboratory is a single National Priority List site, Federal Facility Agreement and Consent Order-required remediation is already progressing at Waste Area Group 1, Test Area North; Waste Area Group 4, Central Facilities Area; and Waste Area Group 5, Power Burst Facility. The majority of Operable Unit 10-04 remediation will be initiated after remediation of Waste Area Groups 1, 4, and 5 is complete. The working schedule presented in this Scope of Work may be accelerated or extended based on the risk-driven integrated cleanup of the Idaho National Engineering and Environmental Laboratory.

Remedial actions have begun at Operable Unit 10-04, which meet the Federal Facility Agreement and Consent Order requirement to commence substantial, continuous physical onsite remedial action within 15 months of issuing the final Record of Decision. These actions include establishing and maintaining institutional controls as defined in the Operable Unit 10-04 Record of Decision for the individual waste area groups, initiating institutional controls for Operable Unit 10-04 sites, and initiating long-term ecological monitoring. In addition, a time-critical removal action has been initiated for the removal and disposal of identified unexploded ordnance in support of the Record of Decision.

The U.S. Department of Energy Idaho Operations Office, in accordance with the U.S. Environmental Protection Agency and Idaho Department of Environmental Quality, has established target dates and enforceable milestones for the remedial design activities at each of the 17 remedial action sites in Operable Unit 10-04 as part of this Scope of Work. A schedule was developed based on enforceable milestones that establish all work elements and deliverables for the Operable Unit 10-04 remedial action. A summary of estimated costs to implement the remedies is included in this Scope of Work.

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ACRONYMS

ARAR	applicable or relevant and appropriate requirement
BORAX	Boiling Water Reactor Experiment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DOE-ID	U.S. Department of Energy Idaho Operations Office
EBR-I	Experimental Breeder Reactor-I
EPA	U.S. Environmental Protection Agency
FFA/CO	Federal Facility Agreement and Consent Order
FR	Federal Register
FRG	final remediation goal
ICDF	INEEL CERCLA Disposal Facility
IDEQ	Idaho Department of Environmental Quality
INEEL	Idaho National Engineering and Environmental Laboratory
LDR	land disposal restriction
MDA	Mass Detonation Area
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NOAA	National Oceanic and Atmospheric Administration
NODA	Naval Ordnance Disposal Facility
NPG	Naval Proving Ground
NPL	National Priorities List
O&M	operations and maintenance
OMRE	Organic-Moderated Reactor Experiment
OU	operable unit

RA	remedial action
RAO	remedial action objective
RCRA	Resource Conservation and Recovery Act
RD	remedial design
RD/RA	remedial design/remedial action
RDX	Royal Demolition Explosive
RI/FS	remedial investigation/feasibility study
ROD	Record of Decision
SOW	Scope of Work
SRPA	Snake River Plain Aquifer
STF	Security Training Facility
TNT	trinitrotoluene
TSCA	Toxic Substances Control Act
USGS	United States Geological Survey
UXO	unexploded ordnance
WAG	waste area group

Operable Units 6-05 and 10-04, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Remedial Design/Remedial Action Scope of Work

1. INTRODUCTION

In accordance with the *Federal Facility Agreement and Consent Order for the Idaho National Engineering Laboratory* (DOE-ID 1991), the U.S. Department of Energy Idaho Operations Office (DOE-ID) submits the following Remedial Design/Remedial Action (RD/RA) Scope of Work (SOW) for remediation of Waste Area Group (WAG) 6, Experimental Breeder Reactor-I (EBR-I)/Boiling Water Reactor Experiment (BORAX) area and WAG 10 miscellaneous sites, hereafter referred to as Operable Unit (OU) 10-04. The RD/RA identified in this SOW—as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process—will proceed in accordance with the signed *Record of Decision, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites* (DOE-ID 2002a).

The Record of Decision (ROD) provides the approach for the RD/RA. This SOW identifies the work elements, summary project schedule, project funding estimate, and responsible organizations for the remedial activities and includes the following:

- A brief project summary
- Bounding assumptions
- Unresolved issues
- Strategy for RD/RA and rationale for remedial work element breakout
- Scope of each remedial work element for the SOW
- Scope of draft remedial design (RD) documents for the RD work plan
- Schedule for RD work elements
- A milestone log for primary and secondary documents
- Plans to expedite RD/RA
- Funding needs and funding availability for RD/RA
- Regulatory requirements
- Design approval procedures
- Correlation between plans and specifications
- Community Relations Plan.

Because this RD/RA SOW incorporates the elements of the remedial design work plan for OU 10-04, a separate remedial design work plan will not be submitted. If funding limitations cause a significant delay between preparation of any RD/RA work plan and the start of remediation, the RD/RA work plan may be revised to update cost estimates, assess the availability of innovative technology, and incorporate any new health, safety, and regulatory requirements.

1.1 Background

Background information for EBR-I, BORAX, and the miscellaneous sites is discussed in the OU 10-04 ROD (DOE-ID 2002a), the *Comprehensive Remedial Investigation/Feasibility Study for Waste Area Groups 6 and 10 Operable Unit 10-04* (DOE-ID 2001), and the *Proposed Plan for Operable Unit 10-04, Waste Area Groups 6 and 10* (DOE-ID 2002b).

Waste Area Group 6 consists of sites related to EBR-I and BORAX, which are located close together in the southwest portion of the Idaho National Engineering and Environmental Laboratory (INEEL) (see Figure 1) and have similar operational backgrounds and sources of contamination. The EBR-I was the first reactor built on the INEEL; in 1951, it became the first reactor in the world to generate electricity from nuclear power. Of the many buildings that once made up the EBR-I complex, only the original reactor building (now a national historic landmark) and associated structures remain.

The BORAX facility included five experimental reactors, built between 1953 and 1964, for research in generating electricity using boiling-water reactors. On July 17, 1955, BORAX-III became the first nuclear reactor to power a town, when it supplied electricity to Arco, Idaho. The BORAX-I reactor intentionally was destroyed in 1954, during research on reactor safety, and its burial location underwent final remediation in 1996 (DOE-ID 2001). All other facilities at BORAX have been removed and the areas remediated.

Waste Area Group 10 includes miscellaneous INEEL sites and the portions of the Snake River Plain Aquifer (SRPA) outside the other WAGs at the INEEL (WAGs 1 through 9). To address Sitewide groundwater issues and potential new sites, an additional operable unit, OU 10-08, was added under WAG 10. These Sitewide issues will be addressed in a future remedial investigation/feasibility study (RI/FS) and ROD. Figure 2 shows the INEEL with the WAG 10 CERCLA sites.

1.2 Remedial Action Objectives

Remedial action objectives (RAOs) were developed in accordance with the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 CFR 300) and CERCLA RI/FS guidance (EPA 1988). The intent of the RAOs is to set goals for protecting human health and the environment. The RAOs for OU 10-04 are listed in Sections 8, 9, and 10 of the ROD, and final remediation goals (FRGs) are identified in Table 22, Table 28, and Section 12.2 of the ROD (DOE-ID 2002a).

The RAOs will be achieved through execution of the selected remedial action. The FRGs listed in Table 22, Table 28, and Section 12.2 of the ROD provide the basis for verification of meeting the RAOs (DOE-ID 2002a). Achievement of the FRGs will be demonstrated by confirmatory sampling and/or elimination of the complete, postulated exposure pathways, thus ensuring protection of human health and the environment consistent with the RAOs. The elimination of postulated exposure pathways will not necessarily eliminate the need for institutional controls. If contamination is left in place above concentrations that preclude unrestricted use, institutional controls will be implemented to ensure protection of human health and the environment.

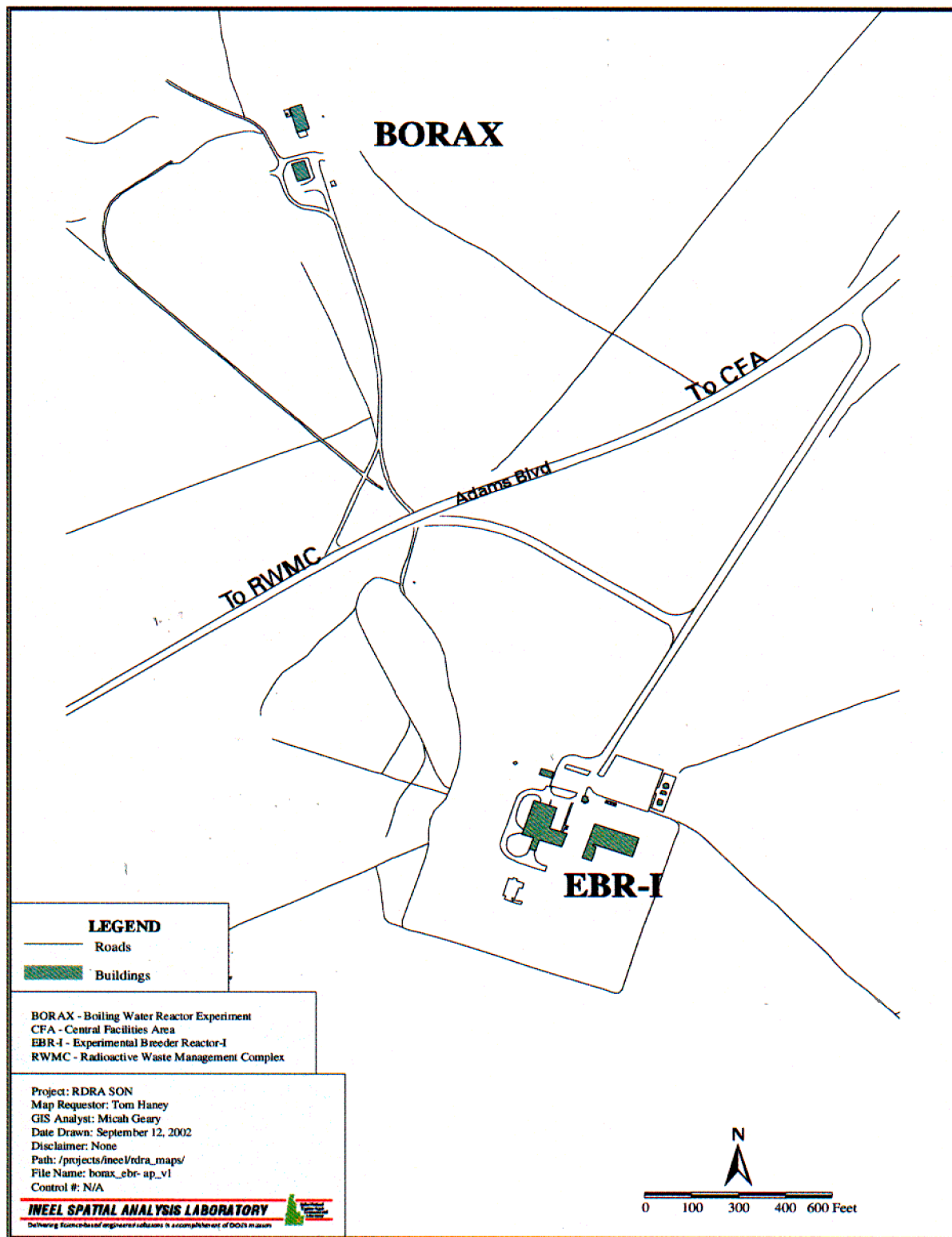


Figure 1. Location of Waste Area Group 6 at the Idaho National Engineering and Environmental Laboratory.

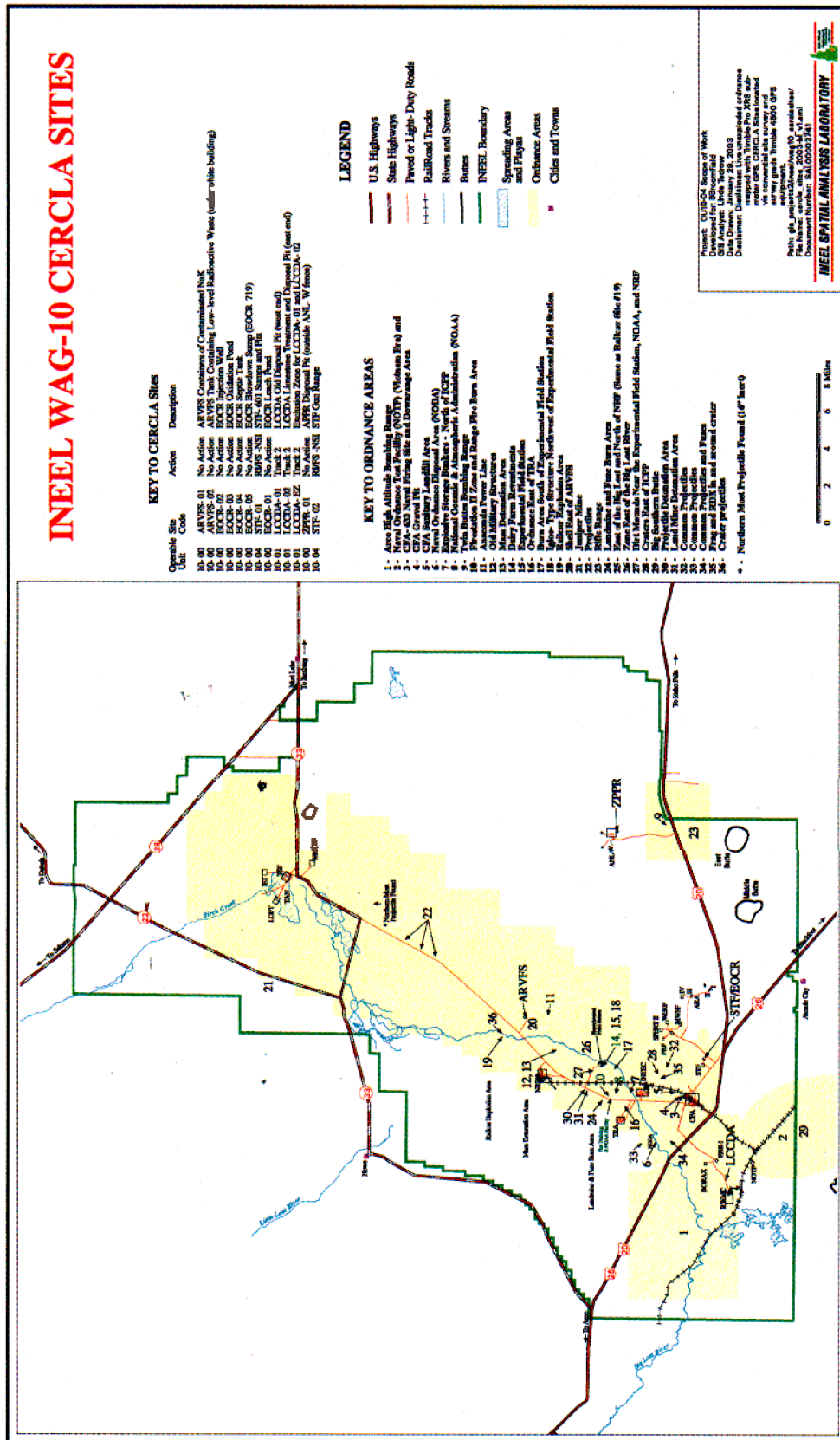


Figure 2. Idaho National Engineering and Environmental Laboratory area with Waste Area Group 10 Comprehensive Environmental Response, Compensation, and Liability Act sites.

1.3 Selected Remedy

The remedial alternatives identified in the OU 10-04 RI/FS (DOE-ID 2001) were developed to achieve the stated RAOs, provide overall protection of human health and the environment, and meet applicable or relevant and appropriate requirements (ARARs) while being cost effective.

Among the remedial alternatives developed and evaluated, the following remedies identified in the OU 10-04 ROD (DOE-ID 2002a) were selected in consideration of CERCLA requirements, the detailed analysis of alternatives, and public comments:

Site	Selected Remedy
Ordnance areas (see Figure 3)	Unexploded ordnance detection, removal, and institutional controls
Trinitrotoluene/Royal Demolition Explosive-contaminated soil sites (see Figure 4)	Removal, treatment of trinitrotoluene/Royal Demolition Explosive fragments, disposal of soil, and institutional controls
Security Training Facility (STF-02) Gun Range (see Figure 5)	Removal and treatment of soil and debris

For OU 10-04 sites requiring remediation, the operations and maintenance (O&M) plan will specify prerediation and postremediation requirements to ensure adequate protection of human health and the environment and will specifically address requirements for prerediation removal (i.e., a time-critical removal action) of identified hazardous surface unexploded ordnance (UXO) and trinitrotoluene (TNT)/Royal Demolition Explosive (RDX) fragments that pose a near-term risk.

At the ordnance areas and TNT/RDX-contaminated soil sites, contamination might be left in place in excess of health-based levels because some buried UXO and TNT/RDX fragments might not be detected during remediation. A review will be conducted within 5 years after initiation of remedial action to ensure that the remedy is still effective in protecting human health and the environment and to assess the need for additional remediation, monitoring, and institutional controls. Comprehensive statutory 5-year reviews will be conducted to evaluate contaminant migration, effectiveness of institutional controls, and overall effectiveness of the remedial actions. Institutional controls will be implemented at sites with residual contamination that precludes unrestricted use, as described in the OU 10-04 ROD (DOE-ID 2002a).

Additional OU 10-04 activities to be conducted include long-term ecological monitoring, development and implementation of an INEEL-wide institutional control plan, disposition of investigation- and remediation-derived waste, and groundwater sampling for TNT, RDX, and related degradation products. Institutional controls and INEEL-wide ecological monitoring are discussed in Section 11 of the ROD (DOE-ID 2002a). Institutional control plans for OU 10-04 sites and all INEEL CERCLA sites requiring institutional control will be developed in accordance with U.S. Environmental Protection Agency (EPA) Region 10 policy (EPA 1999) for institutional controls. The policy is designed to ensure that remedies incorporating institutional controls are protective and will remain protective in the future. The disposition of stored and investigative-derived waste and groundwater monitoring are discussed in Section 12 of the OU 10-04 ROD (DOE-ID 2002a).

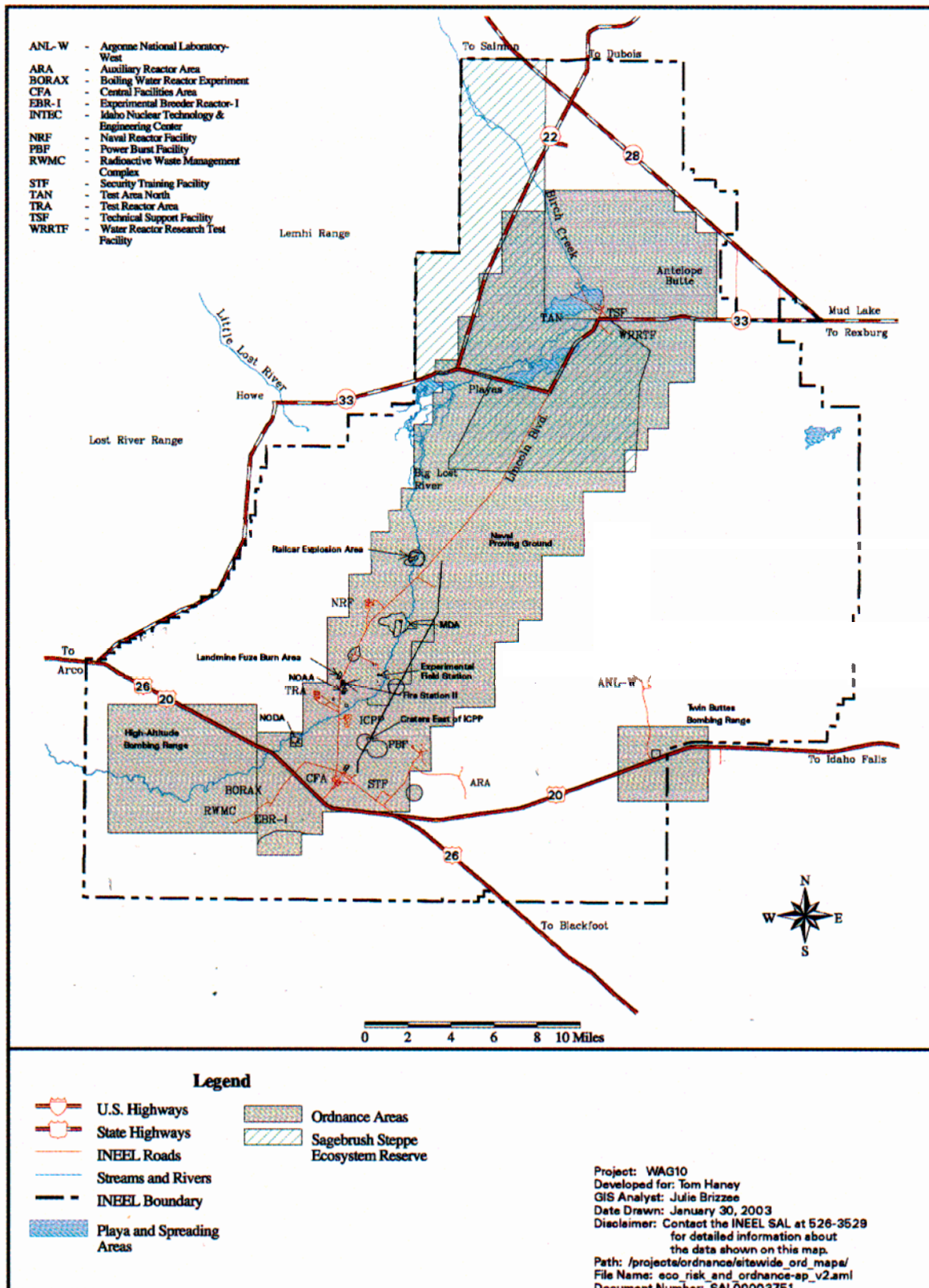


Figure 3. Locations of Waste Area Group 10 ordnance areas at the Idaho National Engineering and Environmental Laboratory.

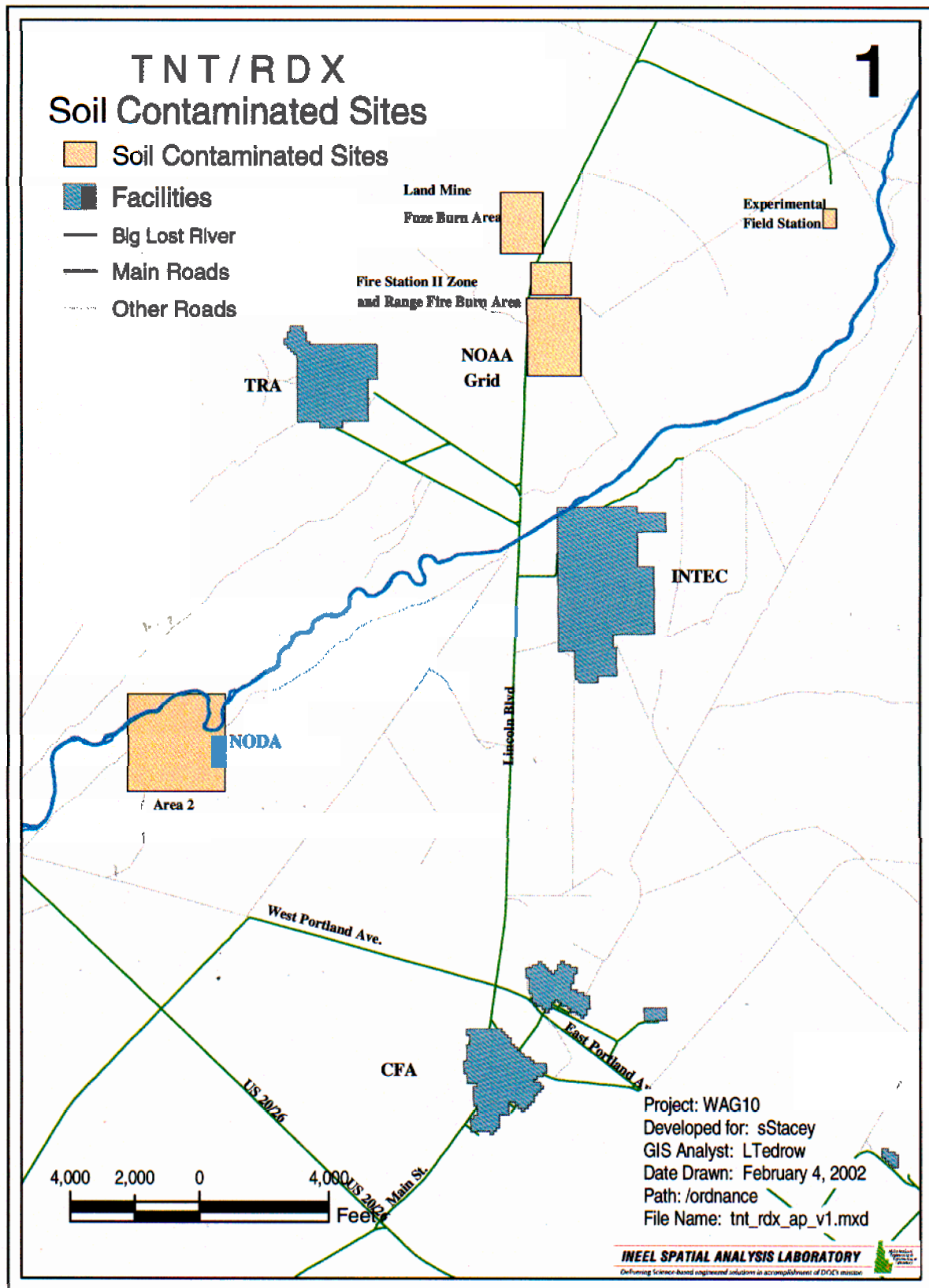


Figure 4. Location of the trinitrotoluene/Royal Demolition Explosive-contaminated soil sites at the Idaho National Engineering and Environmental Laboratory.

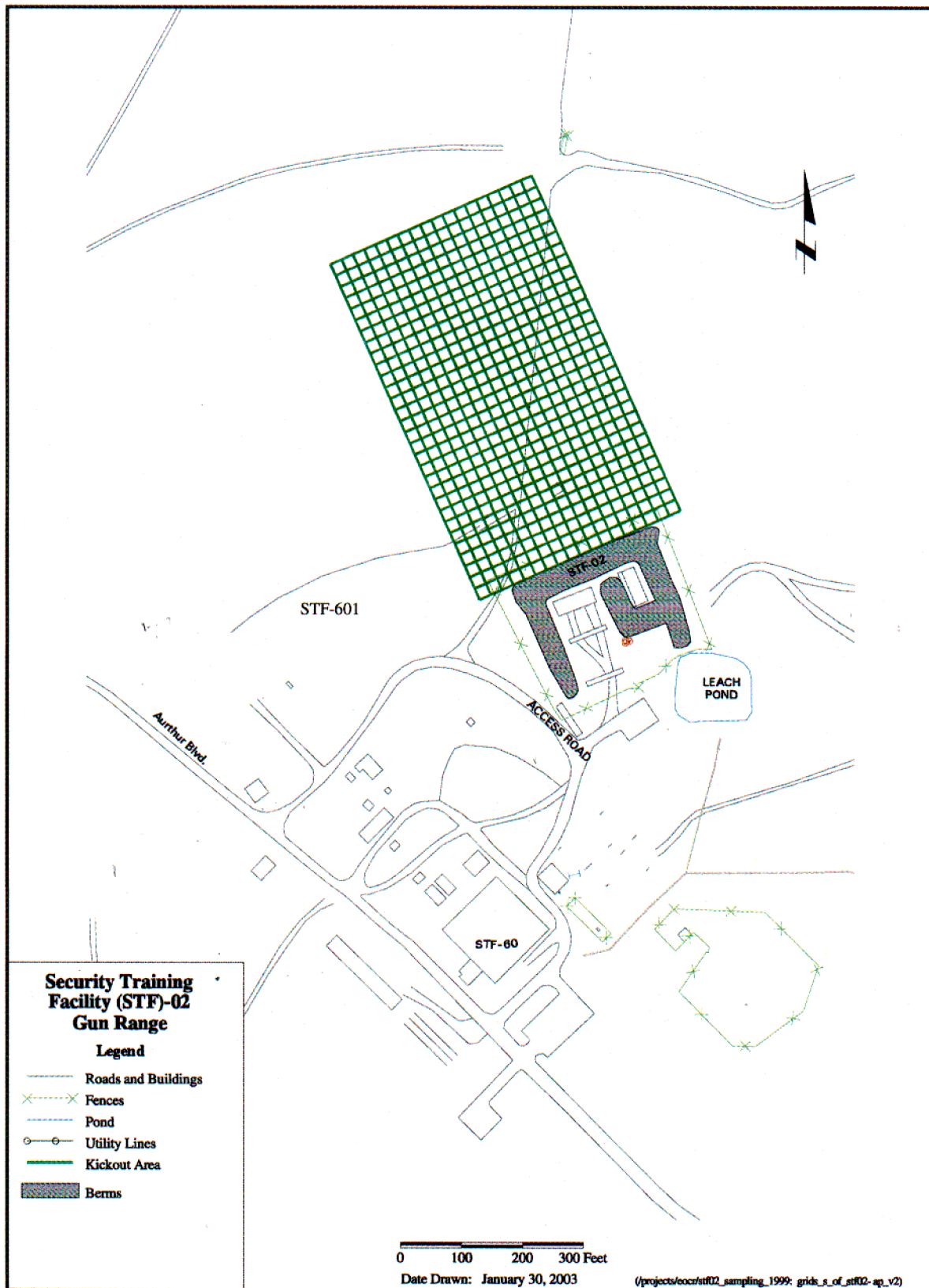


Figure 5. Security Training Facility-02 Gun Range Site.

2. ASSUMPTIONS

The bounding assumptions under which the RD/RA activities will be performed include the following:

- The U.S. Department of Energy (DOE) will ensure that institutional controls are in effect for at least 100 years or more to ensure protectiveness, unless it is concluded in a 5-year review that unrestricted land use is allowable.
- Any groundwater monitoring required for OU 10-04 sites will be conducted under the OU 10-08 INEEL-wide groundwater-monitoring program.
- Archeological concerns will be addressed during the design stage and will not delay planned activities.
- Compatible waste storage will be available during OU 10-04 remediation activities.
- The INEEL CERCLA Disposal Facility (ICDF) or other approved disposal facility on or off the INEEL will be available for OU 10-04 waste disposal.
- Ecological risks will be reduced by remedial actions implemented to reduce human health risks for those sites presenting both types of risks.
- Remediation goals based on hazard quotients of 10, or soil concentrations of 10 times background values, are protective of ecological receptors.
- All OU 10-04 soils to be remediated, except at the STF-02 Gun Range, are not Resource Conservation and Recovery Act (RCRA) hazardous waste, Toxic Substances Control Act (TSCA) regulated waste, nor radioactively contaminated (40 CFR 761).
- At the STF-02 Gun Range, the soil and creosote-treated railroad ties are only RCRA regulated for lead; no other contaminants exist that would be RCRA regulated (42 USC § 9601 et seq.).
- The DOE will allow recycling of the metal fragments recovered from the STF-02 Gun Range.
- Remedial action will be phased in conjunction with available funding.

3. UNRESOLVED ISSUES

Issues that have not been resolved, or studies that are still in progress for OU 10-04 remediation, include the following:

- The availability of the ICDF or other approved disposal facility on or off the INEEL to accept OU 10-04 waste during the remediation period
- The availability of demonstrated and proven technology for large-scale UXO surveys for INEEL site conditions during the remediation period
- Potential groundwater contamination at the TNT/RDX-contaminated soil sites that might require monitoring or remediation
- The availability of adequate funding while remediation projects with higher priority are implemented.

4. APPROACH AND DELIVERABLES

Implementation of the ROD will consist of the following elements:

- Remedial design
- Remedial action
 - Field construction activities
 - Five-year reviews and yearly inspections at sites requiring institutional controls
 - Long-term operations and maintenance, institutional controls, and monitoring.

Sections 4.1 and 4.2 contain brief descriptions of the required deliverables for RD and remedial action (RA) phases. The RD scope, deliverables, and criteria—as well as the general RA scope—are discussed for the following areas:

- Ordnance areas
- TNT/RDX-contaminated soil sites
- STF-02 Gun Range.

The OU 10-04 ROD (DOE-ID 2002a) identifies institutional control requirements for sites at WAGs 6 and 10 and commits to the development and implementation of an INEEL-wide institutional control plan for all INEEL CERCLA sites requiring such control. The OU 10-04 RD/RA work plan will include a site-specific institutional control plan for OU 10-04 institutional control sites and an INEEL-wide institutional control plan, consistent with the requirements of EPA Region 10 policy on the use of institutional controls at federal facilities (EPA 1999).

Long-term ecological monitoring also will be performed, as described in the OU 10-04 ROD (DOE-ID 2002a). Plans for long-term ecological monitoring will be included in the O&M plan for institutional controls.

4.1 Remedial Design

An RD work package will be prepared for each remedy selected for OU 10-04 sites (ordnance areas, TNT/RDX-contaminated sites, the STF-02 Gun Range, and institutional control sites). The RD packages will include designs and specifications for the respective remedial actions. In addition, the RD package for institutional controls will address the long-term ecological monitoring requirements.

Plans for sampling the wells downgradient from the TNT/RDX-contaminated sites are being prepared concurrent with this SOW. If results indicate groundwater monitoring or remediation is required, it will be addressed as part of the OU 10-08 INEEL-wide groundwater-monitoring program. If results indicate groundwater contamination is at or above the remediation goals, an assessment will be performed to determine the extent of contamination. Remedial alternatives will then be developed and evaluated, and a remedy will be selected and implemented in accordance with an amended ROD for OU 10-04.

The OU 10-04 RD/RA work plans will delineate activities for remediation of the ordnance areas, the TNT/RDX-contaminated soil sites, the STF-02 Gun Range, and the institutional control sites. Each RD/RA work plan covering these remedial actions will be submitted as primary documents under the Federal Facility Agreement and Consent Order (FFA/CO) (DOE-ID 1991) and will include the following:

- Detailed drawings and specifications

- A detailed cost estimate for RA activities
- Identification of any relevant changes to this SOW arising from the design effort
- RA schedule
- Identification of primary and secondary documents and dates of submittal
- A description of how the proposed RD and RA will meet substantive aspects of the ARARs identified in the OU 10-04 ROD (DOE-ID 2002a—Tables 11, 26, and 32)
- Discussion of any changes from the ROD, if applicable
- Identification of RA inspections, problems, and reports.

Supporting documents to the RD/RA work plans will include the following:

- O&M plan
- Waste management plan
- Project-specific sampling and analysis plan, which will include a health and safety plan and quality assurance project plan
- Storm water pollution prevention plan, if required.

4.1.1 Scope

The scope of the RD for the OU 10-04 remedial actions is described in the following subsections. No other design documents will be submitted formally before submittal of the draft RD/RA work plans.

4.1.1.1 Ordinance Areas. The remedial design of the INEEL ordnance areas consists of implementing and maintaining institutional controls until the UXO hazard is removed or reduced to acceptable levels; performing visual and geophysical surveys to define the extent of the UXO; investigating UXO targets to determine the risk of land use and determine the extent of UXO removal required; and performing surface clearance and intrusive UXO removal with disposal by detonation at the Mass Detonation Area (MDA) or in-place detonation. The UXO areas to be surveyed include the Naval Proving Ground (NPG), the Twin Buttes Bombing Range, the Arco High-Altitude Bombing Range, and adjacent land areas, which encompasses nearly 400 mi². The design will include strategies to cost effectively survey such a large area to define the extent and density of UXO.

Plans will be developed for demonstrating and validating innovative geophysical survey technologies. These plans will define performance objectives, establish the metrics for success, and identify the measurements that will be made to confirm success.

A field sampling plan will be developed to perform geophysical surveys and intrusive UXO investigation of identified targets and to define the boundaries of UXO-contaminated areas. Methods will be developed to determine explosive characteristics of the UXO and ordnance accessibility. Requirements for conducting a baseline hazard assessment will be established, and objectives for UXO removal will be defined. The baseline hazards assessment will be used to describe and estimate the likelihood of adverse consequences from an encounter with UXO. Equipment and procedures will be specified for UXO surface clearance, intrusive removal, and detonation. An O&M plan will be prepared that will specify prerediation and postremediation requirements for removal of identified hazardous surface UXO to

ensure adequate protectiveness of human health. The O&M plan may be updated periodically before remediation is completed if land use plans, ARARs, or priorities for remediation change. Health and safety plans and quality assurance project plans will be prepared. Waste handling and disposition methods will be identified and described in the waste management plan.

4.1.1.2 Trinitrotoluene/Royal Demolition Explosive-Contaminated Soil Sites. The remedial design of the TNT/RDX soil sites includes excavating contaminated soil in excess of the human health FRGs, removing the fragments of TNT/RDX on the ground surface and segregating any fragments from the soil, destroying the TNT/RDX fragments by detonation at the MDA, and disposing of the contaminated soil in a landfill on the INEEL. Institutional controls such as access controls and land-use restrictions will be established and maintained until the TNT/RDX contamination is reduced to the human health FRG levels specified in the OU 10-04 ROD, which are 4.4 mg/kg for RDX and 16 mg/kg for TNT. Before soil excavation, surveys for UXO will be performed using standard military techniques, and UXO will be removed, if required, to proceed with soil excavation. Otherwise, UXO removal will be performed during remediation of the ordnance areas.

A safety analysis will be performed to determine if the soils can be excavated mechanically or if manual methods must be used. A sampling and analysis plan will be prepared to establish criteria for the UXO survey before excavation, to determine the extent of soil that must be removed to meet FRGs, and to characterize the waste generated during remediation. The contaminated soil will be sampled to determine the concentrations of TNT and RDX. Contaminated soil below 10% will not be regulated as RCRA reactive waste and will be disposed of at an approved facility on or off the INEEL. If the concentration of TNT/RDX is above 10%, the soil will be transported to an approved treatment, storage, and disposal facility off the INEEL for thermal treatment and disposal. Verification sampling also will be performed at the soil excavation sites to confirm that soils above the FRGs have been removed.

The waste management plan and health and safety plan will specify requirements for segregating the TNT and RDX fragments from the soil, transporting the fragments to the MDA, detonating the fragments, and managing the contaminated soil until it is permanently disposed of. An O&M plan will be prepared that will specify prerediation and postremediation requirements for removal of identified hazardous surface TNT and RDX fragments to ensure adequate protection of human health and the environment. The O&M plan may be updated periodically before remediation is completed if land use plans, ARARs, or remediation priorities change. The excavation sites will be restored in accordance with the INEEL revegetation procedures.

4.1.1.3 Security Training Facility-02 Gun Range. The remedial design of the STF-02 Gun Range includes excavating soils contaminated with lead above the FRG of 400 mg/kg, treatment to separate particulate metal from the soil, recycling the metal, disposing of residual soils that exceed 400 mg/kg lead, encapsulating and disposing of the railroad ties, and disposing of the building and asphalt pad. A sampling and analysis plan will be prepared to determine the extent of soil requiring removal, to characterize waste generated during remediation, and to confirm that the FRG has been achieved. Approximately 20,000 yd³ of soil will be excavated and treated. The physical separation treatment will partition the heavy metal particles from the soil based on the differences in physical properties (such as density, size, and shape). A health and safety plan will be prepared to establish equipment requirements, site controls, training, and emergency protocols. The recovered metal will be sent off the INEEL for recycling if permitted by DOE policy. Otherwise, the metal will be stabilized with a suitable grout and disposed of at a landfill on or off the INEEL.

A waste management plan will be developed to specify criteria for managing the waste generated during remediation, which will include soil contaminated with lead, lead impregnated railroad ties, and wood and asphalt debris. Soil with lead concentrations below the FRG after treatment will be returned to the STF-02 Gun Range Site. Soil that is determined to be RCRA characteristic for lead will be stabilized

with a suitable grout to meet RCRA land disposal restriction (LDR) criteria and disposed of at a facility on or off the INEEL. Disposal facilities on the INEEL could be the Central Facilities Area (CFA) Landfill or the ICDF. Soil above the FRG, but not RCRA characteristic for lead, will be disposed of without further treatment at the CFA Landfill, the ICDF, or other disposal facility on or off the INEEL. The actual disposal facilities will be determined during RA.

The railroad ties will be encapsulated to meet RCRA LDR criteria and disposed of at a compliant disposal facility on or off the INEEL. The wooden building and asphalt pads will be disposed of at the CFA or ICDF. The RD package also will contain plans to restore the site to be consistent with the surrounding area by contouring and vegetating.

4.1.1.4 Institutional Controls. This RD package will consist of developing an approach for establishing, implementing, enforcing, inspecting, and monitoring institutional controls at OU 10-04 sites (listed in Table 1) and for all INEEL CERCLA sites requiring institutional controls in accordance with EPA Region 10 policy (EPA 1999). The O&M plan developed during this RD for the institutional control sites will be the mechanism for implementing institutional controls at OU 10-04 sites and all INEEL CERCLA sites that require institutional controls. For OU 10-04 sites requiring remediation, the O&M plan will specify prerediation and postremediation requirements to ensure adequate protection of human health and the environment and will specifically address requirements for prerediation removal (i.e., a time-critical removal action) of identified hazardous surface UXO and TNT/RDX fragments that pose a near-term risk.

Institutional controls will be applied initially to 16 of the 50 sites in OU 10-04 and will not be required for the other 34 sites. A summary of the analysis conducted to identify no action and institutional control sites is presented in Table 33 of the OU 10-04 ROD (DOE-ID 2002a). The institutional control program will ensure that control measures are in place (such as excavation restrictions, fencing, and warning signs) that are protective for occupational scenarios.

The following elements for the OU 10-04 institutional control plan and the comprehensive INEEL-wide institutional control plan will involve procedures for controlling activities, as outlined in the EPA Region 10 policy (EPA 1999):

- A comprehensive listing of all areas or locations in OU 10-04 and all other areas and locations on the INEEL that have, or will have, institutional controls for protection of human health or the environment. The information on this list will include (at a minimum) the location of the area, the objectives of the restriction or control, the timeframe for which the restrictions apply, and the tools and procedures that will be applied to implement the restrictions or controls and to evaluate the effectiveness of these restrictions or controls.
- Identification—made legally binding where appropriate—of all entities and persons including, but not limited to, employees, contractors, lessees, agents, licensees, and invitees relevant to the INEEL and OU 10-04 institutional controls.
- Identification of all activities and reasonably anticipated future activities including, but not limited to, future soil disturbance, routine and nonroutine utility work, well placement and drilling, grazing activities, groundwater withdrawals, paving, construction, renovation work on structures, or other activities that could occur on INEEL CERCLA sites with institutional controls.
- A tracking mechanism that identifies all land areas under restriction or control.

- A process to promptly notify both the EPA and the State of Idaho before any anticipated change in land-use designation, restriction, land users, or activity for any institutional control required by a decision document.

In addition, the OU 10-04 and the INEEL-wide comprehensive approach will incorporate the INEEL land use plan, installation maps, and other installation policies and orders.

Table 1. Operable Unit 10-04 sites where institutional controls will be applied (DOE-ID 2002a).

Site Code	Description
BORAX-01	BORAX II through V Leach Pond
BORAX-02	BORAX-I Burial Site
BORAX-08	BORAX Ditch
BORAX-09	BORAX II through V
EBR-08	EBR-I (WMO-703) Fuel Oil Tank
OMRE-01	OMRE Leach Pond
ORD-01	Arco High-Altitude Bombing Range
ORD-03	CFA-633 Naval Firing Site and Downrange Area (including 17 smaller ordnance sites: ORD-04, ORD-05, ORD-07, ORD-11, ORD-12, ORD-13, ORD-14, ORD-16, ORD-17, ORD-18, ORD-19, ORD-20, ORD-22, ORD-25, ORD-26, ORD-27, and ORD-28)
ORD-06	Naval Ordnance Disposal Area
ORD-08	National Oceanic and Atmospheric Administration Site
ORD-09	Twin Buttes Bombing Range
ORD-10	Fire Station II Zone and Range Fire Burn Area
ORD-15	Experimental Field Station
ORD-21	Juniper Mine
ORD-24	Land Mine Fuze Burn Area
STF-02	STF Gun Range
BORAX = Boiling Water Reactor Experiment	
EBR = Experimental Breeder Reactor	
OMRE = Organic-Moderated Reactor Experiment	
STF = Security Training Facility	

4.1.1.5 Ecological Monitoring. The INEEL-wide long-term ecological monitoring will be implemented under the OU 10-04 ROD (DOE-ID 2002a) to ensure protection of the INEEL ecosystem. The RD package for institutional controls will include a comprehensive ecological surveillance and monitoring plan to eliminate uncertainty in the INEEL-wide ecological risk assessment, allow coordination with ongoing environmental monitoring efforts, allow coordination with other agency activities, and address stakeholder concerns. The following will be provided in the ecological monitoring plan:

- A schedule for site walk-downs and visual inspections to ensure assumptions in the risk assessment are still applicable
- Yearly sampling and analysis of site-specific flora and fauna to determine ecological contamination and to monitor possible migration of contamination by ecological receptors based on location or area-specific field sampling plans (approximately 10% of these samples will be taken from a reference area for background comparison)

- A waste management plan to characterize, assess, and dispose of contaminated media generated from field sampling (such as sample residue, sampling equipment, and personnel protective equipment)
- Criteria for annual status reports to support the 5-year review
- Specifications for research studies to support the development and understanding of long-term trends in the INEEL ecology (such as measuring effects on INEEL populations or individual species).

4.1.1.6 Groundwater Sampling. Groundwater monitoring wells downgradient from the TNT/RDX-contaminated soil sites will be sampled for TNT; RDX; 2,4-dinitrotoluene; 2,6-dinitrotoluene; and the degradation products 1,3,5-trinitrobenzene and 4-amino-2,6-dinitrotoluene. The wells to be sampled are listed in Table 2 and the locations on the INEEL are shown in Figure 6.

Table 2. Well locations for groundwater sampling.

Potential Source Areas	Wells for Sampling
NODA	Highway 3 Rifle Range Production Well
Mass Detonation Area	USGS-099 Site-04
Railcar Explosion Area	USGS-017 USGS-097
Experimental Field Station	USGS-121 Fire Station Production Well
Fire Training and NOAA Facility	USGS-058 USGS-076 USGS-121
Landmine and Fuze Burn Area	Fire Station Production Well

NOAA = National Oceanic and Atmospheric Administration
NODA = Naval Ordnance Disposal Facility
USGS = United States Geological Survey

4.2 Remedial Action

In accordance with CERCLA requirements (42 USC § 9601 et seq.), RA at OU 10-04 sites will begin no later than 15 months from the date of the signing of the OU 10-04 ROD (DOE-ID 2002a). The RA will consist of the fieldwork required to perform the work described by the RD.

The RD/RA work plans establish the schedule and deliverables for RA. Each RD/RA work plan will incorporate, by reference, pertinent aspects of the SOW and will include the following:

- Specify any relevant changes in the content of the SOW arising from the design effort
- Update schedules in the SOW by including dates for the submittal of primary and secondary documents for the remedial action work element
- Update the cost estimate for RA
- Identify additional RA secondary documents.

INEEL Aquifer Wells for TNT & RDX Sampling

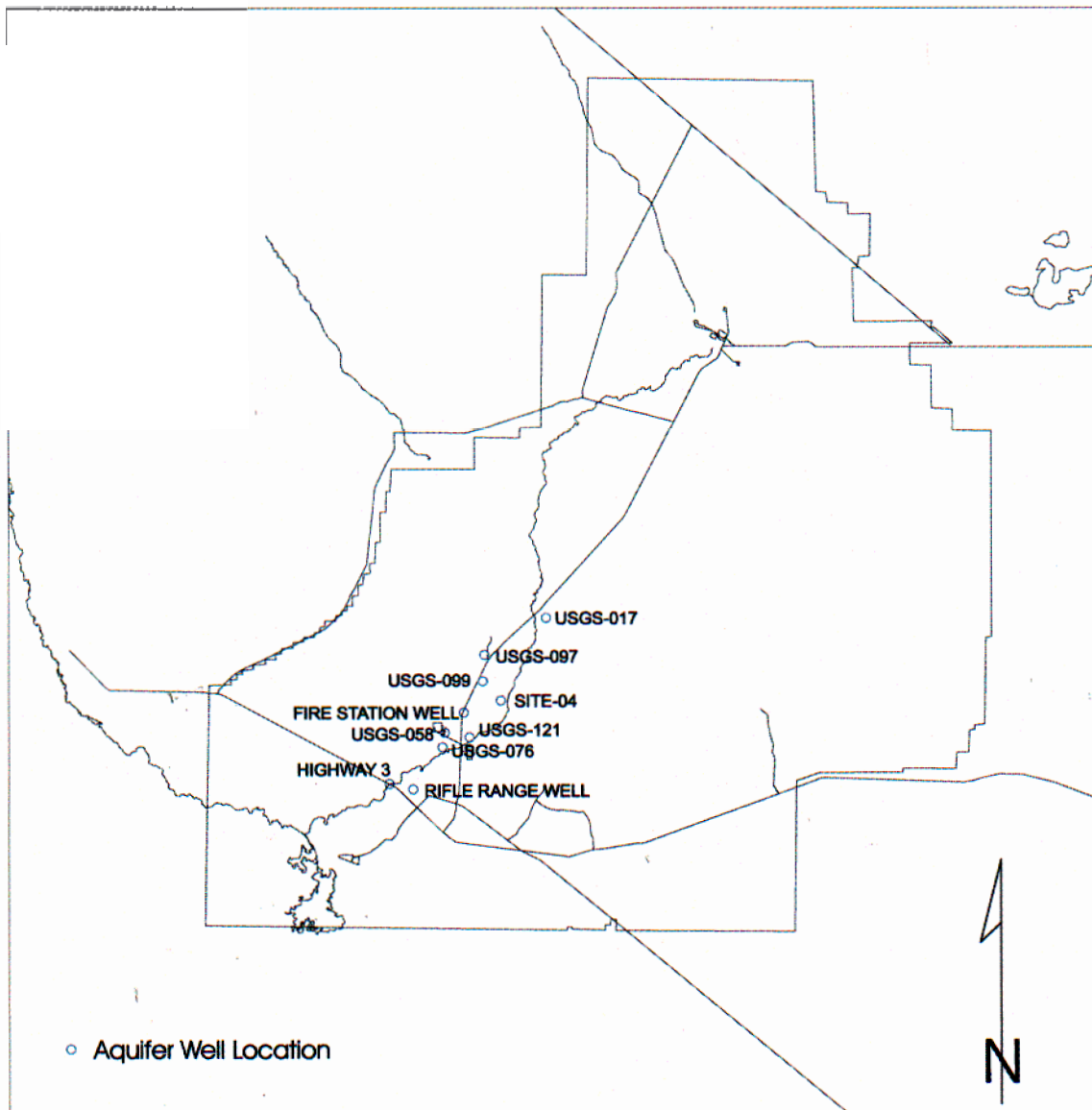


Figure 6. Wells for trinitrotoluene and Royal Demolition Explosive sampling.

General RA deliverables will include a prefinal inspection report and the RA report. The prefinal inspection report will include the following components:

- Outstanding construction requirements such as problems encountered during RA, final quantities of soil requiring remediation and treatment, amount of UXO discovered requiring detonation, and updates to the O&M plans
- Actions required to resolve items
- Completion dates
- The date of the final inspection.

The RA report will be submitted as an FFA/CO primary document following the RA and will provide an overview of the remedial activities, including any changes to the remedial design. The RA report will include the following:

- A brief description of outstanding items from the prefinal inspection report and how these items were resolved
- Identification of work defined in the remedial action work plan and certification that the work was performed
- Explanation of any modification to the remedial action work plan
- Certification that the selected remedy is operational and functional
- Documentation necessary to support deletion of a site from the National Priorities List (NPL) (54 FR 48184), as appropriate.

4.3 Five-Year Reviews

Annual facility evaluations along with monitoring results will establish the basis of the 5-year review. The RD/RA work plans will detail the protocol of these reviews, and the O&M plan will include provisions for modifying the scope or periodicity of the 5-year reviews as determined by DOE-ID, EPA, and Idaho Department of Environmental Quality (IDEQ) consensus. Evaluations of technology development for UXO detection and mapping will be summarized and included in the 5-year review documentation.

5. SCHEDULE AND DELIVERABLES

In accordance with Section XII of the FFA/CO (DOE-ID 1991), the documents submitted to DOE-ID, EPA, and IDEQ as deliverables are presented in Table 3 with the corresponding submittal dates. Appendix A includes a full schedule of tasks to complete the RD/RA work plans and perform the remedial actions.

A more detailed schedule for deliverables, following initiation and completion of the RA, will be provided in the appropriate RD/RA work plan, and any changes in the working schedule and content from this SOW will be noted. These remedial action deliverables will be revisited as necessary in the appropriate RD/RA work plan, and any changes in schedule and content will be noted.

Table 3. Operable Unit 10-04 remedial design/remedial action working and enforceable schedule.

Item	Document Type ^a	Working Schedule Dates	Enforceable Schedule Dates
Submit draft RD/RA SOW to DOE-ID, EPA, and IDEQ	NA	November 19, 2002	November 2002
Submit draft RD/RA Work Plan for institutional controls and ecological monitoring to DOE-ID, EPA, and IDEQ	Primary	September 30, 2003	September 2003
Submit draft RD/RA Work Plan for the TNT/RDX sites to DOE-ID, EPA, and IDEQ	Primary	March 30, 2004	March 2004
Submit draft RD/RA Work Plan for STF-02 to DOE-ID, EPA, and IDEQ	Primary	April 30, 2005	April 2005
Submit draft RD/RA Work Plan for the ordnance areas to DOE-ID, EPA, and IDEQ	Primary	July 30, 2006	July 2006
Submit draft RA Report for institutional controls and ecological monitoring to DOE-ID, EPA, and IDEQ	Primary	August 30, 2004	August 2004
Submit draft RA Report for the TNT/RDX sites to DOE-ID, EPA, and IDEQ	Primary	November 30, 2008	November 2015
Submit draft RA Report for STF-02 to DOE-ID, EPA, and IDEQ	Primary	March 30, 2011	August 2018
Submit final RA Report for the ordnance areas to DOE-ID, EPA, and IDEQ	Primary	November 30, 2013	September 2020
Submit draft O&M Report to DOE-ID, EPA, and IDEQ	Primary	TBD ^b	TBD ^b

a. Primary or secondary document reviews will be conducted in accordance with the FFA/CO (DOE-ID 1991, Part VIII).

b. The draft O&M report will be prepared within 90 days after completion of O&M activities.

DOE-ID = U.S. Department of Energy Idaho Operations Office
EPA = U.S. Environmental Protection Agency
FFA/CO = Federal Facility Agreement and Consent Order
IDEQ = Idaho Department of Environmental Quality
O&M = operations and maintenance
RA = remedial action
RD/RA = remedial design/remedial action
RDX = Royal Demolition Explosive
SOW = Scope of Work
STF = Security Training Facility
TNT = trinitrotoluene

6. STRATEGY AND PLANS FOR EXPEDITING

The goal for implementation of the OU 10-04 RD/RA is to perform the work in a timely, safe, efficient, and cost-effective manner. The strategy to accomplish this goal includes the following:

- Use lump sum and competitive bid procurement methods for each action
- Streamline the document preparation and review process by conducting concurrent activities and expedited reviews
- Work closely with DOE-ID, EPA, and IDEQ for quick resolution of issues
- Optimize construction efficiency and productivity by scheduling during summer weather.

Through preliminary design meetings, consensus will be reached between DOE-ID, EPA, and IDEQ on the scope of the RD approaches and contents. In addition, conference call meetings will be employed, as necessary, to expedite resolution of comments on OU 10-04 RD/RA work plans.

7. COST ESTIMATE

The estimated costs for the OU 10-04 RD/RA are summarized in Table 4. The estimate, in Fiscal Year 2001 dollars, includes both direct and indirect costs associated with design and construction. Direct costs include the estimated dollars for equipment, construction, and operation activities to conduct remedial action. Indirect costs include the estimated dollars for activities that support remedial action such as construction management, project management, and management reserve. Actual costs will vary based on the final design and detailed cost itemization.

Detailed cost estimates for the STF-02 Gun Range, TNT/RDX-contaminated soil sites, and the ordnance areas are in Appendix I of the OU 10-04 RI/FS (DOE-ID 2001). The cost for the OU 10-04 institutional control sites was presented in the OU 10-04 ROD (DOE-ID 2002a). At this time, the cost for INEEL-wide institutional controls cannot be estimated, since remedial alternatives have not been selected for several sites, especially OU 3-14 and OU 7-13/14. The cost for institutional control at these sites could vary considerably depending on the remedy selected and implemented. At this time, it is presumed ecological monitoring will be performed through 2078 at an estimated cost of \$700,000 per year. The groundwater sampling cost assumes a single sampling event at 10 groundwater-monitoring wells downgradient from the TNT/RDX sites.

Table 4. Estimated cost of the Operable Unit 10-04 final remediation.

Site Name	Total Capital Cost in Net Present Value	Total O&M Cost in Net Present Value	Total Project Cost in Net Present Value
STF-02 Gun Range	\$3,535,000	NA	\$3,535,000
TNT/RDX Contaminates Soil Sites	\$1,257,000	\$2,635,000	\$3,892,000
Ordnance Areas	\$11,685,700	\$4,154,300	\$15,840,000
OU 10-04 Institutional Control Sites	NA	\$2,957,500	\$2,957,500
INEEL-wide Institutional Controls	NA	TBD	TBD
INEEL-wide Ecological Monitoring	NA	\$21,415,000	\$21,415,000
Groundwater Sampling of 10 Wells for TNT, RDX, and Degradation Products	NA	\$55,000	\$55,000

*Contingency at 30% is included in each activity

INEEL = Idaho National Engineering and Environmental Laboratory

NA = not applicable

O&M = operations and maintenance

OU = operable unit

RDX = Royal Demolition Explosive

STF = Security Training Facility

TBD = to be determined

TNT = trinitrotoluene

8. REGULATORY REQUIREMENTS

Under CERCLA (42 USC § 9601[121]), response actions conducted entirely onsite are exempt from obtaining federal, state, or local permits, but are, however, required to comply with the substantive aspects of the ARARs specified for the site. The selected remedy will comply with the ARARs and achieve the performance standards specified by the OU 10-04 ROD (DOE-ID 2002a—Tables 11, 26, and 32).

In accordance with the FFA/CO (DOE-ID 1991, Section 7.7[a]), federal and state permits must be noted that would be required if the remedial action were not conducted under CERCLA. No permits are required to remediate OU 10-04 sites.

9. DESIGN APPROVAL PROCEDURES AND REQUIREMENTS

Procedures and requirements for obtaining approval of the remedial design documents will be conducted in accordance with the FFA/CO (DOE-ID 1991). The various deliverables identified in Sections 4 and 5 will be reviewed for each work element from both an environmental compliance and a technical standpoint. The following elements will be reviewed:

- Compliance with ARARs
- Use of currently accepted environmental control measures and technology
- Adequacy of the design plans
- Consistency with the ROD
- Implementability
- Accuracy of the cost estimate
- Use of currently accepted practices and techniques
- Environmental impacts.

The DOE-ID will have the authority to approve and accept the remedial design with concurrence from EPA and IDEQ.

9.1 Plans for Disposition of Changed Conditions

Changes from planned conditions inevitably will occur during the execution of RD/RA. Identification and rapid disposition of significant changes are critical to successful project implementation. The protocol for disposition of changes occurring during the design phase is set forth as follows:

- Any changed condition arising from newly discovered site conditions or inconsistencies discovered in existing documentation (e.g., the RI/FS or ROD) shall be brought to the attention of DOE-ID, EPA, and IDEQ by periodic conference calls or status meetings in conjunction with preparation of a written description of the issue for documentation purposes. Items of significant importance may be addressed in impromptu conference calls or meetings. Changes that may affect the ROD will be addressed in accordance with FFA/CO-established protocol (DOE-ID 1991).
- Design changes required as a result of changed conditions could include an increase or decrease in the amount of material excavated, treated and/or disposed of. Unexpected conditions could be discovered that affect other aspects of the design and will be addressed when discovered.

10. CORRELATION BETWEEN PLANS AND SPECIFICATIONS

General correlation between the drawings and the technical specifications for OU 10-04 RD/RA activities will be ensured through the project procedures. Before approval, the RD/RA project manager will review all drawings and specifications. Any changes made after final approvals and signatures will require a review and approval by the same individuals who performed the original review and approval or by their designees. For environmental, safety and health, and quality assurance reviews, verification of the completeness and correctness of a drawing is conducted to achieve the following objectives:

- Ensure that the drawing reflects the design intent as expressed in design input documents, calculations, and sketches
- Ensure that the drawing expresses the requirements of the codes and standards in the design criteria
- Provide resolution of any conflicts between the data shown on the drawings and specifications and verification that the data are included in other pertinent drawings or specifications
- Present the information clearly, completely, and accurately.

The DOE-ID, EPA, and IDEQ will conduct preliminary design meetings to ensure integration of and consistency between the drawings and technical specifications. The subsequent design submittals will build on the initial design submittals.

11. COMMUNITY RELATIONS PLAN

The requirements for RD/RA elements of the *INEEL Community Relations Plan* (DOE-ID 1995) are found in the National Oil and Hazardous Substance Pollution Contingency Plan (NCP) (40 CFR 300.435[c]). Prepared in accordance with the NCP, the *INEEL Community Relations Plan* describes both the NCP-required RD/RA community relations' activities and additional INEEL-specific activities that may occur during the course of this project. The OU 10-04 RA will be conducted in accordance with the *INEEL Community Relations Plan*.

Additional information about past community participation is contained in the OU 10-04 ROD (DOE-ID 2002a) and includes *INEEL Reporter* articles, *INEEL Progress* annual updates to the *INEEL Reporter*, the *Citizens' Guide*, also an annual update to the *INEEL Reporter*, telephone briefings, fact sheets, informal open houses, the associated Proposed Plan (DOE-ID 2002b), and public meetings.

12. REFERENCES

- Public Law 99-499, 1986, "Superfund Amendments and Reauthorization Act of 1986 (SARA)," 100 Statutes 1728, *Public Law*, October 17, 1986.
- 42 USC § 4321 et seq., 1970, "National Environmental Policy Act," *United States Code*, January 1, 1970.
- 42 USC § 6901 et seq., 1976, "Resource Conservation and Recovery Act (Solid Waste Disposal Act)," *United States Code*, October 21, 1976.
- 42 USC § 9601 et seq., 1980, "Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA/Superfund)," *United States Code*, December 11, 1980.
- 54 FR 48184, 1989, "National Priorities List of Uncontrolled Hazardous Waste Sites; Final Rule," *Federal Register*, U.S. Environmental Protection Agency, November 21, 1989.
- 40 CFR 761, 2003, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*, Office of the Federal Register, January 2003.
- 40 CFR 300, 2003, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*, Office of the Federal Register, January 2003.
- 40 CFR 268.45, 2003, "Alternative LDR Treatment Standards for Contaminated Soil," *Code of Federal Regulations*, Office of the Federal Register, January 2003.
- DOE-ID, 2002a, *Record of Decision, Experimental Breeder Reactor-I/Boiling Water Reactor Experiment Area and Miscellaneous Sites, Operable Units 6-05 and 10-04*, DOE/ID-10980, Revision 0, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; and Idaho Department of Environmental Quality, Idaho Falls, Idaho, November 2002.
- DOE-ID, 2002b, *Proposed Plan for Operable Unit 10-04 Waste Area Groups 6 and 10*, U.S. Department of Energy Idaho Operations Office; U.S. Environmental Protection Agency, Region 10; and Idaho Department of Environmental Quality, Idaho Falls, Idaho, January 2002.
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- EPA, May 3, 1999, Memorandum, "Region 10 Final Policy on the Use of Institutional Controls at Federal Facilities," U.S. Environmental Protection Agency, Region 10, Office of Environmental Cleanup.

EPA, 1988, *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA*, *Interim Final*, EPA/540/G-89/004, U.S. Environmental Protection Agency, October 1988.